# — Mysteries of our Moon —
# The Neutral Point Discrepancy

**The gravitational neutral zone between the Earth and the Moon is not where it is supposed to be. What does it all mean?**


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A lunar probe or spacecraft launched from the Earth will continuously lose velocity until it reaches the neutral point due to the Earth's gravitational pull. However, after it passes the neutral point, the Moon's pull becomes stronger and it begins to accelerate, increasing in velocity. It must have the proper trajectory to assume a lunar orbit or to score a direct hit.

The need for an accurate measurement of the Moon's gravity, hence the precise neutral-point distance, was pointed out by Hugh Odishaw, Executive Director of the United States National Committee for the IGY (International Geophysical Year). He presented a report in 1958 to all member nations of the IGY, entitled "Basic Objectives of a Continuing Program of Scientific Research in Outer Space".[1] In it he indicated that estimates of the Moon's mass at that time were based on observations of the motions of asteroids and the Earth's polar axis. The uncertainty attributed to the Moon's mass was given as 0.3 per cent, which was great enough to affect lunar rocket trajectories.

Accordingly, Odishaw indicated the desirability of determining the Moon's mass more precisely in early Moon experiments. This could be accomplished by tracking the rocket as it approached the Moon and deriving the Moon's pull at each point of the trajectory, hence the surface gravity.

By now, the reader probably realises how much difficulty NASA and the Russians would have had in sending successful Moon probes, even if they knew the exact position of the neutral point. If the neutral point, hence the Moon's gravitational pull, deviated considerably from the predicted value derived from Newton's Law of Universal Gravitation, a series of failures would be expected in attempts to send successful lunar probes. It is also reasonable to conclude that a discovery of a significant difference in the expected Moon gravity would require many more years of reprogramming, rocket design, lunar probe design, and so on. The time required for people to readjust their thinking patterns would also be significant, especially after nearly 300 years of education and training in the gravitational concepts of Isaac Newton. In the style of the [US] Department of Defense, it should also be expected that suppression of the new findings would occur. Keeping these ideas in mind, along with the conventional idea of the position of the neutral point from the Moon, the history of lunar probes will be reviewed.

The Moon was chosen as the first target for exploration because it is the closest celestial body to the Earth. Russia was the first nation to send a successful lunar probe, called *Luna 1*, on January 2, 1959. It flew within 4,660 miles of the surface and broadcast information back to Earth after travelling into space. The US had made three unsuccessful attempts with *Pioneers 1*, *2*, and *3* in 1958 before achieving a fly-by 37,300 miles from the surface several months after *Luna 1*.

*Luna 2* was launched on September 12, 1959 and became the first lunar probe to hit the Moon, sending back signals before impact. *Luna 3* was launched October 4, 1959 and circled behind the Moon, approaching within 4,372 miles. It sent back pictures of the far side. Significantly, the Russian program for exploration of the Moon came to a stop for four years following the *Luna 3* lunar probe! All of the *Luna* shots were tracked with radar to collect trajectory and gravitational data.

As previously mentioned, the trajectory of an object in the Moon's vicinity enables the surface gravity to be calculated, which, in turn, enables the neutral point to be calculated. If the findings deviated from the expected ones, it would probably require years to reassess and re-engineer future Moon probes. A soft landing would require a much larger launch vehicle and a great deal more fuel if the gravity were a lot higher than expected.

Russia's secrecy concerning its space program is well-known. Therefore, the US may not have benefited from information obtained by Russian Moon probes. According to

Ralph Lapp in *Man and Space—The Next Decade*:

*"...the Soviets clamped tight secrecy over their rockets, never once releasing a photograph of a launching. Moreover, the Russian scientists were slow in making their data available to the scientific community."*[2]

In addition, the US *Pioneer 4* fly-by at 37,300 miles may not have been close enough to the Moon to enable NASA engineers to determine the true nature of lunar gravity. At any rate, subsequent *Ranger* missions indicated that the US was having many problems in achieving successful moonshots.

The first *Rangers* carried seismometers in spherical containers designed to withstand the impact of landings. Unfortunately, *Ranger* 3, launched on January 26, 1962, missed its target completely and went into a solar orbit. *Ranger 4* hit the Moon on April 23, but did not send back any useful information. *Ranger 5* was launched on October 18 and missed the Moon by 450 miles; however, it was tracked for over eight hours. Further launches were put off until 1964 and the entire program was reorganised.

It is significant that all *Ranger* missions after number five were designed only to take pictures because of the difficulty in achieving a semi-hard landing with the seismometer package. The seismometer was encased in a 30-inch balsa-wood ball which was to be slowed sufficiently by retro-rockets to hit the surface at 150 miles per hour and still survive. It was designed to be able to impact granite at 200 miles per hour and continue to operate. If the Moon had only one-sixth of Earth's surface gravity, then perhaps the seismometer packages would have survived. However, if lunar gravity were much more than expected, a successful landing without big enough retro-rockets for braking would be impossible. Evidently, *Ranger* scientists anticipated that the weak one-sixth gravity would keep the velocity of impact down to a low enough level. Since they eliminated the package from further missions and delayed these missions for almost a year and a half, perhaps they learned something new about the Moon's gravity.

**The question is why the real neutral-point distance leaked out. Did some of the NASA people try to sabotage the cover-up?**

After Russia's four years of silence, *Luna 4* was launched on April 2, 1963. It flew within 5,300 miles of the Moon. The purpose of this probe was never revealed except for a brief announcement that:

*"...experiments and measurements which were conducted...are completed. Radio communication with the spacecraft will continue for a few more days."*[3]

It is probable that the need for detailed gravity data was behind the mission. Soft landings could not be successful without this information.

The US launched *Ranger 6* on January 30, 1964 and the electrical system was allegedly burned out when the cameras were accidentally turned on during the flight, hence no pictures were sent. After supposedly redesigning the system to eliminate this danger, *Ranger 7* was launched on July 28. It was successful, and sent back thousands of pictures. *Ranger 8* was launched on February 17, 1965, and *Ranger 9* was launched on March 21, 1965. Both were successful, and some of the *Ranger 9* pictures were broadcast on television.

The Russians attempted a soft landing with *Luna 5* on May 9, 1964, but it crashed at full speed. *Luna 6* was launched on June 8 but missed the Moon, while *Luna 7* crashed because the retro-rockets supposedly fired too soon. *Luna 8* was sent up on December 3 and also crashed. *Luna 9* landed successfully on the Moon on February 3, 1966.

The US soft-landing program was called *Surveyor* and began in 1960. In 1962 a decision was made to trim the weight of *Surveyor* by more than 300 pounds, with many experiments abandoned. The reason given was problems with the proposed *Atlas* Centaur second stage. *Surveyor*'s scheduled 1963 launch date passed and it was not even close to being ready. The project costs were running 10 times the original estimates and "troubles" forced one delay after another. A congressional inquiry was made, and the House Committee on Science and Astronautics found fault with the management practices of the Jet Propulsion Laboratory (JPL), NASA, and the prime contractor, Hughes Aircraft. In *We Reach the Moon*, John Noble Wilford gave an account of the *Surveyor* difficulties.[4] It seems JPL officials conceded that they initially underestimated the difficulty of the project. One official admitted that the project was not given enough support in the earlier days and that they were overconfident in their ability to do things.

It is probably more than coincidental that the *Ranger 5* failure on October 18, 1962 resulted in the abandonment of the seismometer package and a significant delay in future *Ranger* missions due to the difficulty in a semi-hard landing. The *Surveyor* program was delayed for 28 months from its schedule, and *Surveyor 1* did not soft-land on the Moon until June 2, 1966. Photo 1 shows *Apollo 12* astronaut Alan Bean standing next to *Surveyor 3* which landed on April 20, 1967 inside a crater in Oceanus Procellarum. The *Apollo 12* lunar module is in the background on the rim of the crater.

The US effort to orbit the Moon using lunar probes began on August 17, 1958 with *Atlas Able 1*. It missed the Moon, as did the next two attempts. A decision was then made to build a larger spacecraft and to use the *Atlas* Agena D as the carrier. It appears that a larger rocket was necessary to carry a larger payload which may have consisted of fuel used in braking the proposed orbiter. This would be necessary to reduce the velocity of the satellite so that it could achieve an orbit. Again, it seems more than coincidental that the project to orbit the Moon, which began in 1958, was postponed until 1964 when the Boeing Company began work on the *Lunar Orbiter* project.

The Russians managed to place *Luna 10* into orbit around the Moon on April 3, 1966 after having successfully soft-landed with *Luna 9* on February 3, 1966. It appears that substantial retro-rocket braking was required for orbit insertion as well as soft landing. At any rate, both were accomplished a short time apart. US *Lunar Orbiter 1* successfully went into lunar orbit on August 14, 1966. *Lunar Orbiter 5* was sent crashing into the Moon on January 31, 1968 after a successful mission. These missions photographed over 99 per cent of the Moon and led to the discovery of lunar mascons, or increases in the Moon's surface gravity in certain areas.

The above analysis of lunar probes indicates that the US and Russia probably had a clear picture of the nature of lunar gravity as early as 1959. However, it is a certainty that both countries learned how to work with lunar gravity and make soft landings by 1966. This date is important in light of information on lunar gravity to be presented next.

The reader has been kept in suspense concerning suggestions that Moon gravity might deviate from the predicted value of one-sixth of Earth's. This was necessary to provide background information needed to make a proper evaluation. The analysis will

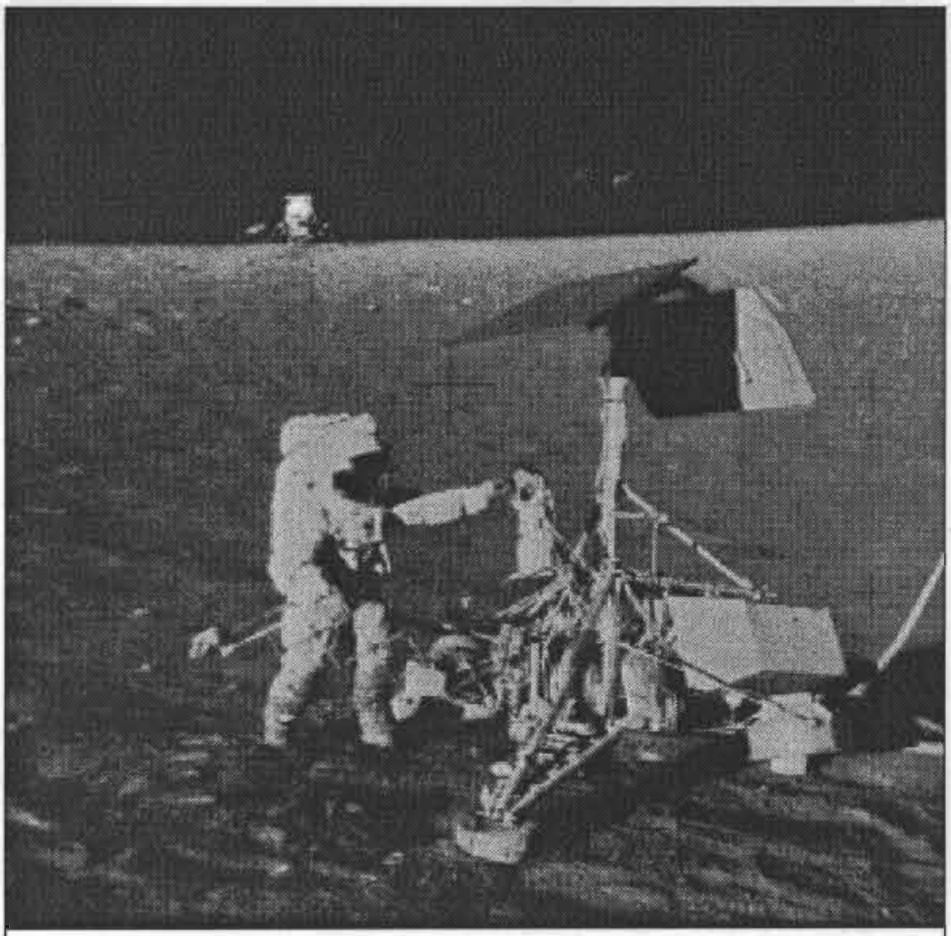

Photo 1: *Apollo 12* astronaut Alan Bean standing next to *Surveyor 3*, with the lunar module in the background. (NASA photo)

now focus on the position of the neutral point, as given to the public by various writers and organisations subsequent to lunar probes. Ultimately, the source of the information is probably NASA. In reference to *Apollo 11*, *Time* magazine gave the following neutral point information in the July 25, 1969 issue:

"*At a point 43,495 miles from the moon, lunar gravity exerted a force equal to the gravity of the earth, then some 200,000 miles distant.*"[5]

The reader might be surprised concerning this statement since the neutral-point distances presented in Chapter 2 were all 20,000 to 25,000 miles from the Moon. It might seem that *Time* has made an error; therefore, other sources will be pursued to verify this figure.

In the 1969 edition of *History of Rocketry & Space Travel* by Wernher von Braun and Frederick I. Ordway III, the following statement is made concerning *Apollo 11*:

"*The approach to the Moon was so precise that the mid-course correction scheduled for 8:26 am (EDT) on the 19th was canceled. At a distance of 43,495 miles from the Moon,* Apollo 11 *passed the so-called 'neutral' point, beyond which the lunar gravitational field dominated that of Earth. Consequently, the spacecraft, which had been gradually losing speed on its long coast away from Earth, now began to accelerate.*"[6]

Note that the precision of the flight was so great that the mid-course correction was not needed. In addition, the neutral-point distance is given to the nearest mile and agrees exactly with the value given previously by *Time* magazine.

Another reputable source is the *Encyclopaedia Britannica*. This organisation generally publishes information which is accepted by orthodox scientists. Therefore, their claim for the neutral-point distance should be in close agreement with Wernher von Braun. In reference to *Apollo 11*, the *Britannica* stated the following in the 1973 printing within the topic, "Space Exploration":

"*Consideration of the actual dynamics of the* Apollo *trajectory will review the statements made above. The* Apollo 11 *spacecraft had been in Earth orbit at 118.5 mi. altitude, travelling at 17,427 mph. By firing the rocket motor at the exact moment when the spacecraft was precisely aligned along the proper trajectory, the velocity was increased to 24,200 mph. Because the Earth's gravitational pull continued to act upon the spacecraft during its two-and-three-quarters-day (64-hr) journey toward the Moon, the spacecraft velocity, with respect to the Earth, dwindled to 2,040 mph at a distance of 39,000 mi. from the Moon. At this point, lunar gravitational attraction became greater than the Earth's and the spacecraft commenced accelerating as it swung toward and around the far side of the Moon, reaching a speed of 5,225 mph. By firing the spacecraft rocket propulsion system, the velocity was reduced to 3,680 mph and the spacecraft entered an elliptical orbit about the Moon.*"[7]

Here the distance is 39,000 miles which is still close to the values given by *Time* magazine and von Braun. In Chapter 2, reference was made to the 1960 printing of the *Encyclopaedia Britannica* which listed the neutral-point distance as 19 Moon radii or 20,520 miles from the Moon. In this case, the distance discrepancy is between different printings of the same source.

In *We Reach the Moon*, Wilford indicated that the spacecraft entered the lunar sphere of gravitational influence about 38,900 miles from the Moon.[8]

In *Footprints on the Moon*, written in 1969 by the writers and editors of the Associated Press, the neutral point is described as follows:

"*Friday, Day Three of the mission, found* Apollo 11 *at the apex of that long gravitational hill between earth and the moon. At 1:12 pm EDT, the nose-to-nose spaceships passed the milestone where the moon's gravity becomes the more important influence. The astronauts were 214,000 miles from earth, only 38,000 miles from their rendezvous with the moon, leading their target like a hunter leads a duck.*"[9]

The reader may already recognise the inconsistencies between the quoted figures which vary between 38,000 and 43,495 miles. Many different values are given with varying degrees of precision, yet they still lie within a range which is radically different from pre-*Apollo* calculations. There is no way to get around the discrepancy between the conventional, pre-*Apollo* distances of 20,000 to 25,000 miles, and the post-*Apollo* range of 38,000 to 43,495 miles. Even though the Earth-to-Moon distance varies between 221,463 and 252,710 miles, and spacecraft do not travel on a straight line between the Earth and Moon, this still does not explain the neutral-point-distance discrepancy. The logical con-

clusion is that the latest neutral-point information reached the general public at about the time of the first *Apollo* lunar landing in 1969, even though it was determined as far back as 1959 from early lunar probes. Clearly, this discrepancy has not been pointed out to the public until now. To this day, the status quo of science and government alludes to the one-sixth gravity of the lunar surface, representative of a neutral point less than 25,193 miles from the Moon. Therefore, the neutral-point discrepancy and its implications must be investigated.

The Moon's surface gravity was calculated with the new figures presented above, using the standard inverse-square-law technique. Since the radii of the Earth and Moon, the neutral-point distance and the Earth's surface gravity are known, the Moon's surface gravity is easily determined. The technique does not require a knowledge of the Moon's mass or the Earth's mass as Newton's Law of Gravitation does. The only aspect of Newton's Law of Gravitation which seems to be valid at this time is the inverse-square-law nature of gravity. Therefore, since the Earth's pull equals the Moon's pull at the neutral point, the inverse square law enables the pull of gravity at the Moon's surface to be determined. (The technical derivation is presented in Appendix B.) The result is that the Moon's surface gravity is 64 per cent of the Earth's surface gravity, not the one-sixth or 16.7 per cent value predicted by Newton's Law of Universal Gravitation!

When the reader stops to consider that the 43,495-mile figure represents the measured value of the neutral-point distance supplied to us by official sources, an annoying paradox arises. Why would experts release this information and continue to refer to the Moon's one-sixth gravity condition, ignoring all the pre-*Apollo* references to the neutral-point distance of less than 25,000 miles?

Additional information suggests that the Moon's gravity might even be higher than 64 per cent of Earth's. In consideration of what appears to be a cover-up, and the sensitivity of the neutral-point distance to slight variations in lunar gravity, NASA could have easily given the public understated figures. If the neutral point is 43,495 miles from the Moon, the surface gravity is 64 per cent of Earth's. Shifting the neutral point out 8,500 miles to around 52,000 miles from the Moon has the effect of increasing the Moon's surface gravity to the same value as Earth's.

The discrepancies (discussed in Chapter 4) involve the orbital period of spaceships around the Moon and velocities attained by spaceships reaching the Moon from the neutral point. The publicised period and velocity values are not supportive of a 43,495-mile neutral-point distance from the Moon. They support the old neutral-point distances and the Moon's weak one-sixth gravity. Therefore, official information is inconsistent and contradictory, indicating a cover-up. The question is why the real neutral-point distance leaked out. Did some of the NASA people try to sabotage the cover-up? ∞

**Footnotes:**


1. Caidin, Martin, *The Moon: New World for Men*, The Bobbs-Merrill Company, Indianapolis, Indiana, USA, 1963, p. 111.
2. Lapp, Ralph E., *Man and Space—The Next Decade*, Harper & Brothers, New York, USA, 1961, p. 51.
3. Von Braun, Wernher and Frederick I. Ordway III, *History of Rocketry & Space Travel*, Thomas Y. Crowell Company, New York, NY, USA, 1969, p. 191.
4. Wilford, John Noble, *We Reach the Moon*, W. W. Norton & Company, Inc., New York, NY, USA, 1969, p. 95.
5. "The Moon—A Giant Leap For Mankind", *Time*, July 25, 1969, p. 14.
6. Von Braun and Ordway, op. cit., p. 238.
7. *Encyclopaedia Britannica*, 1973, 14th ed., s.v. "Space Exploration", p. 1045.
8. Wilford, op. cit., p. 54.
9. The Writers and Editors of The Associated Press with Manuscript by John Barbour, *Footprints on the Moon*, The Associated Press, 1969, p. 201.


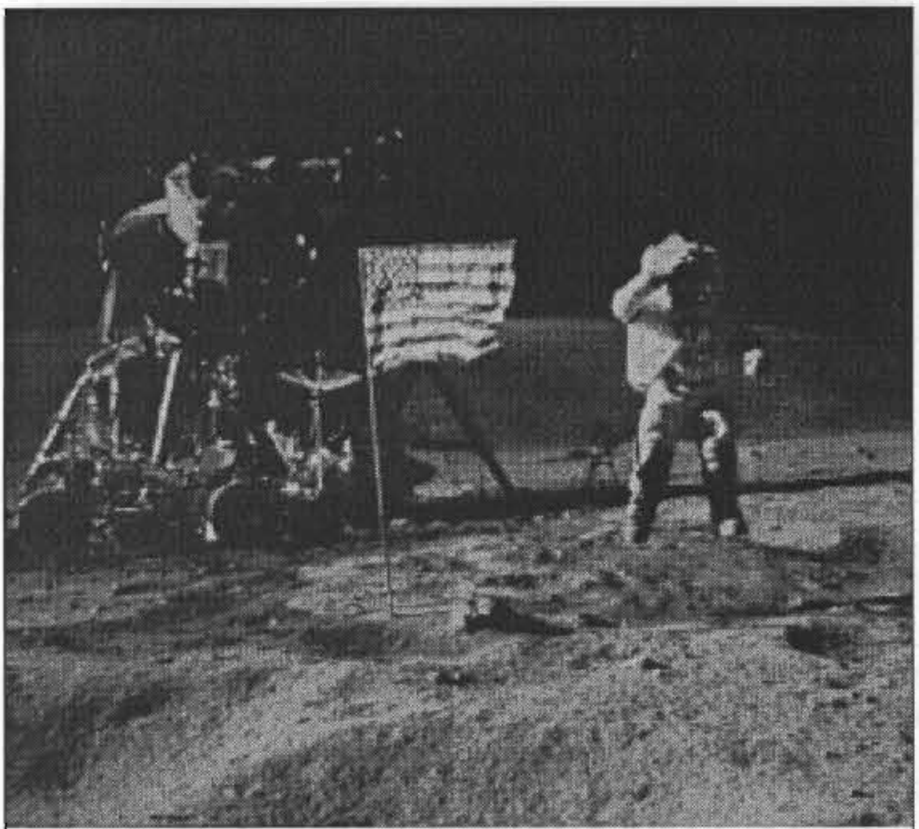

Photo 2: Astronaut Young jumping up from the lunar surface on the *Apollo 16* mission. (NASA Photo)


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William L. Brian II is an engineer who has worked in a writing and editing capacity in private industry. He received B.Sc. and M.Sc. degrees in Nuclear Engineering from Oregon State University in 1970 and 1972, plus an M.B.A. from Portland State University in 1976. Although not considered an expert in the space sciences, he has the mathematical and conceptual skills to verify the NASA-military cover-up from a scientific standpoint.





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